

Multi-Functional Smart Hybrid Hydrogels as Optical Sensing Probes and Light-Responsive Drug Carriers

유지은, 이승기, 탁현진, 낭민정, 오지현, 최인희†
서울시립대학교
(inheechoil@uos.ac.kr†)

Recently, plasmonic nanoparticles have been widely applied in various fields due to their excellent optical properties, easy surface functionalization, and unique photothermal conversion effect. Here, we developed a multi-functional smart hybrid hydrogels (SHHs) composed of plasmonic nanoparticles and biocompatible hydrogels that can be applied to both sensing probes and drug carriers. The SHHs were synthesized by emulsion polymerization of the sugar-based polysaccharide, and plasmonic nanoparticles are spontaneously embedded in the polymeric network upon reducing from metal precursor ions. First, we observed copper ion-mediated dissociation of the SHHs, which was successfully detected below the EPA regulation level (20 μ M) based on plasmon band shifts of the SHHs reacted with copper ions. Second, we demonstrated the light-induced and controllable release from the drug loaded SHHs using three-dimensional tumor spheroids as a model system. We anticipate that the multi-functionality of our SHHs will provide versatile way to develop molecular detection and delivery techniques.